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Resonance absorption of ultrasound due to rotational lattice vibrations

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Abstract

The nuclear spin-phonon interaction Hamiltonian for Van Vleck paramagnets is derived in general form with allowance for rotational vibrations of the crystal lattice. The specific form of the Hamiltonian is given for tetragonal crystal symmetry in the cases S=1/2 and S > 1/2. The coefficient of sound absorption at the electron-nuclear levels as well as the electron spin system is calculated. It is verified that the contribution of rotational lattice vibrations can in a number of cases turn out to be an order of magnitude greater than the contribution depending on the shear and compressive strain. © 1980 Plenum Publishing Corporation.

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